

Topic 1 - Dimensional Instruments

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering
Tennessee Technological University

Topic 1 - Using Calipers

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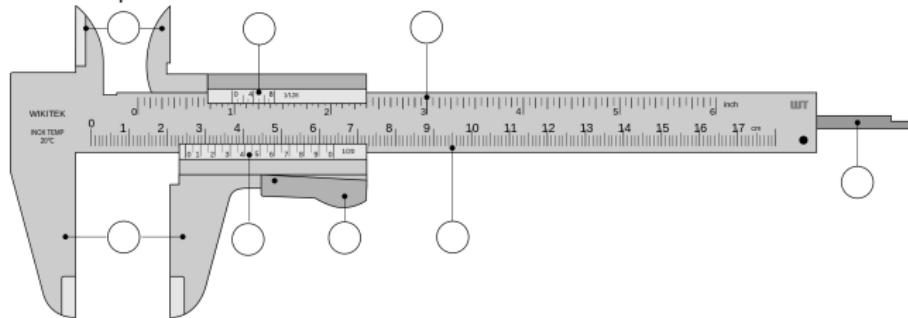
- Overview
- Components
- Vernier Calipers
- Digital Calipers
- Group Activity

Overview

- A caliper (... a pair of calipers) is a device used to measure the distance between two opposite sides of an object. Text: Wikipedia
 - Length, Width, Height
 - Inside and Outside Diameter
 - Depth
- There is a wide variety of caliper(s). This word means different things in different fields.
 - Engineering and Design
 - Machining and Construction
 - Medical Applications and Others

Components

Text: Wikipedia



- ① - Outside jaws: used to take external measures of objects
- ② - Inside jaws: used to take internal measures of objects
- ③ - Depth probe: used to measure the depth of objects
- ④ - Main scale (cm)
- ⑤ - Main scale (inch)
- ⑥ - Vernier (cm)
- ⑦ - Vernier (inch)
- ⑧ - Retainer: used to block movable part

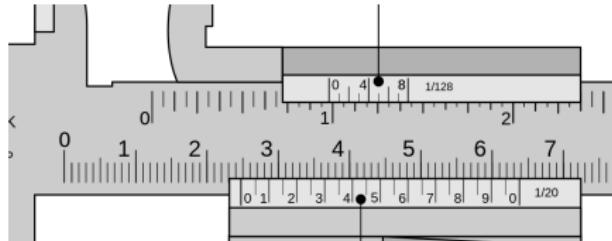
Vernier Calipers

A vernier scale is a visual aid to take an accurate measurement reading between two graduation markings on a linear scale by using mechanical interpolation; thereby increasing resolution and reducing measurement uncertainty by using Vernier acuity to reduce human estimation error.



Vernier Calipers

- ① Inspect the jaws. Wipe the jaws with a clean rag or cloth.
- ② Close the jaws around the object gently and avoid deflecting the object. Verify the reading is zero.
- ③ Read the main scale and record the measurement.
- ④ Read the Vernier scale and add to the main scale measurement.



Digital Calipers

A digital caliper contains an embedded processor and user interface to facilitate the measurement process.



Digital Calipers

- ① Inspect the jaws. Wipe the jaws with a clean rag or cloth.
- ② Close the jaws around the object gently and avoid deflecting the object. Verify the reading is zero.
- ③ If needed, press the button to zero the tool.
- ④ Read the output and record the measurement.



Vernier Calipers

Activity: Compare and Constatst

Complete the compare and contrast acivities on the following two slides.

Duration: ~ 10 minutes

Groups: 2-3 members



Deliverable: Each group member submit a separate copy of your work written in your own words. Include the names of all group members on submission.

Vernier Calipers

Discuss three benefits and three shortcomings of a **vernier calipers**.

Pros

-
-
-

Cons

-
-
-

Digital Calipers

Discuss three benefits and three shortcomings of a **digital calipers**.

Pros

-
-
-

Cons

-
-
-